

## **Amendments to the Claims:**

This following listing of claims will replace all prior versions, and listings, of claims in the application.

## **Listing of Claims:**

1. (currently amended) An electronic automation system comprising:
  - a database of an integrated circuit design;
  - a mouse input device;
  - a graphical user interface tool, capable of accessing and performing operations on the database, based on input from the mouse input device; and
  - a shape-based automatic router tool, capable of accessing the database, ~~using flood operations to create an interconnect route path for at least one net of the integrated circuit design, selected using the graphical user interface tool and the mouse, wherein the interconnect route path comprises segments having different interconnect widths~~ the shape-based automatic router tool being arranged to:
    - using flooding operations to determine an interconnect route path among at least three pins that will be coupled together by a single net, wherein each pin has an associated property value, and
      - the route path has at least a first subnet route for a first subnet coupled to a first pin, a second subnet route for a second subject coupled to a second pin without passing through the first subnet, a third subnet route for a third subnet coupled to a third pin without passing through the first or second subnet, and a fourth subnet route for a fourth subnet which is coupled at a first end to the first and second subnets and coupled at a second end to the third subnet;
      - based on the associated property values of the pins, calculating a current requirement for each subnet;
      - generating the net comprising the first, second, third, and fourth subnets using the determined route path; and
      - widening an interconnect width for the fourth subnet so the fourth subnet has a wider interconnect width than the first, second, or third subnet.

2. (previously presented) The system of claim 1 further comprising:

a file, accessible by the shape-based automatic router tool, comprising a current density table comprising current density as a function of at least one of layer, net frequency, or track width.

3. (previously presented) The system of claim 1 further comprising:

a file, accessible by the shape-based automatic router tool, comprising frequency information for one or more nets of integrated circuit, wherein when frequency information is not provided for a net, DC operation of the net will be assumed.

4. (previously presented) The system of claim 1 further comprising:

a file, accessible by the shape-based automatic router tool, comprising frequency information for one or more nets of integrated circuit, wherein when frequency information is not provided for a net, a warning message is presented.

5. (previously presented) The system of claim 1 wherein the shape-based automatic router tool uses at least one of Steiner tree algorithm, heuristic Steiner tree creation algorithm, or batched greedy algorithm.

6. (canceled)

7. (original) The system of claim 1 wherein the integrated circuit design comprises at least one of a memory integrated circuit, DRAM, EPROM, EEPROM, Flash memory, ASIC, microprocessor, programmable logic device, field programmable gate array, digital signal processor, analog integrated circuit, amplifier circuit, system on a chip, or programmable system-on-a-chip.

8. (previously presented) The system of claim 1 wherein shape-based automatic router tool creates interconnect route paths for two or more nets, and the interconnect route paths are for one layer of the integrated circuit design.

9–12. (canceled)

13. (currently amended) A method of designing an integrated circuit comprising:  
using at least one flooding operation to determine an interconnect route path between a first point and a second point of an integrated circuit design;  
determining a property of the interconnect route path; and  
using a computer processor, creating an interconnect line for the interconnect route path having a width based on the property of the interconnect route path and a design rule;  
creating a first subnet of the interconnect line coupled to the first point;  
creating a second subnet of the interconnect line coupled to the second point without passing through the first subnet;  
creating a third subnet, which joins the first and second subnets  
using the computer processor, widening a width of the third subnet so its width is greater than the first or second subnets.

14. (original) The method of claim 13 wherein the design rule addresses at least one of current density, optical proximity effects, current handling, power handling, reliability, electromigration, voltage drop, or self-heating.

15–20. (canceled)

21. (currently amended) The system of claim 1 wherein the single net is a first net and automatic router tool [[tools]] creates interconnect route paths for [[a]] the first net, a second net, and a third net, each of the first, second, and third nets carrying different signals having different performance requirements, [[and]]

the first net comprises segments subnets having different interconnect widths, the signal based on a digital circuit performance requirement difference between the signals on the first and second nets, the automatic router tool creates the second net having a spacing so that the second net is spaced at least a first distance from each subnet of the first net, and

based on a digital circuit performance requirement difference between the signals on the first and third nets, the automatic router tool creates the third net having a spacing so that the

third net is spaced at least a second distance from each subnet of the first net, wherein the second distance is less than the first distance

~~net comprises segments having different interconnect widths, and the third net comprises segments having different interconnect widths.~~

22. (currently amended) The system of claim 1 wherein the automatic router tool performs detailed routing wherein the fourth subnet join the first, second, and third subnets.

23. (currently amended) An electronic design automation system comprising:  
a database of an integrated circuit design;  
a mouse input device;  
a graphical user interface tool, capable of accessing and performing operations on the database, based on input from the mouse input device; and

an automatic shape-based router tool, capable of accessing the database, using a batched greedy algorithm to create an interconnect route path for ~~at least one~~ a first net of the integrated circuit design, selected using the graphical user interface tool and the mouse, wherein the interconnect route path comprises segments having different interconnect widths,

the automatic shape-based router tool creates a second net of the integrated circuit design, wherein the second net has a spacing so that the second net is spaced at least a first distance from the first net, and

the automatic shape-based router tool creates a third net of the integrated circuit design, wherein the third net has a spacing so that the third net is spaced at least a second distance from the first net, wherein the second distance is less than the first distance.

24. (currently amended) An electronic automation system comprising:  
a database of an integrated circuit design;  
a mouse input device;  
a graphical user interface tool, capable of accessing and performing operations on the database, based on input from the mouse input device;  
a shape-based automatic router tool, capable of accessing the shape-based database, to create an interconnect route path for ~~at least one~~ a first net of the integrated circuit design,

selected using the graphical user interface tool and the mouse, wherein the interconnect route path comprises segments having different interconnect widths,

the automatic shape-based router tool creates a second net of the integrated circuit design, wherein the second net has a spacing so that the second net is spaced at least a first distance from the first net, and

the automatic shape-based router tool creates a third net of the integrated circuit design, wherein the third net has a spacing so that the third net is spaced at least a second distance from the first net, wherein the second distance is less than the first distance; and

a file, accessible by the shape-based automatic router tool, comprising a current density table comprising current density as a function of net frequency.

25. (currently amended) An electronic automation system comprising:

a database of an integrated circuit design;

a mouse input device;

a graphical user interface tool, capable of accessing and performing operations on the database, based on input from the mouse input device;

a shape-based automatic router tool, capable of accessing the shape-based database, to create an interconnect route path for ~~at least one~~ a first net of the integrated circuit design, selected using the graphical user interface tool and the mouse, wherein the interconnect route path comprises segments having different interconnect widths,

the automatic shape-based router tool creates a second net of the integrated circuit design, wherein the second net has a spacing so that the second net is spaced at least a first distance from the first net, and

the automatic shape-based router tool creates a third net of the integrated circuit design, wherein the third net has a spacing so that the third net is spaced at least a second distance from the first net, wherein the second distance is less than the first distance; and

a file, accessible by the shape-based automatic router tool, comprising frequency information for one or more nets of integrated circuit.

26. (previously presented) The system of claim 25 wherein when frequency information is not provided for a net, DC operation of the net will be assumed.

27. (previously presented) The system of claim 25 wherein when frequency information is not provided for a net, a warning message is presented.

28. (previously presented) The system of claim 24 wherein the shape-based automatic router tool uses a batched greedy algorithm to create the interconnect route path.

29. (previously presented) The system of claim 25 wherein the shape-based automatic router tool uses a batched greedy algorithm to create the interconnect route path.

30. (canceled)